Organization TC2100 Bldg./Room PK2

U. S. DEPARTMENT OF COMMERCE
COMMISSIONER FOR PATENTS
P.O. BOX 1450
ALEXANDRIA, VA 22313-1450
IF UNDELIVERABLE RETURN IN TEN DAYS

OFFICIAL BUSINESS

U.S. OFFICIAL MAIL
PENALTY FOR PRIVATE USE $300

UNITED STATES POSTAGE
PITNEY BOWES

02 1A
0004202245

$ 01.75⁰
OCT 04 2004
MAILED FROM ZIP CODE 22202

AN EQUAL OPPORTUNITY EMPLOYER

RETURNED TO SENDER
UNDELIVERABLE AS ADDRESSED
FORWARDING ORDER EXPIRED

RETURNED TO SENDER
UNDELIVERABLE AS ADDRESSED
FORWARDING ORDER EXPIRED



BEST AVAILABLE COPY

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 09/802,710 | 03/08/2001 | Michael P.C. Watts | | 7848 |

7590 10/04/2004

Michael P.C. Watts
1185 Los Trancos Road
Portola Valley, CA 94028

| EXAMINER | |
|---|---|
| GIANOLA, JOHN F | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2135 | |

DATE MAILED: 10/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/802,710 | WATTS, MICHAEL P.C. | |
| | Examiner | Art Unit | |
| | John F Gianola | 2135 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *03/08/2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 March 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3/08/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

1. In June 2004, the USPTO ceased mailing paper copies of cited U.S. patents and U.S. patent application publications with all Office actions. See "USPTO to Provide Electronic Access to Cited U.S. Patent References with Office Actions and Cease Supplying Paper Copies," 1282 O.G. 109 (May 18, 2004). Foreign patent documents and non-patent literature will continue to be provided to the applicant on paper.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1, 3-7, 10, 11, 16, 17, 20, 21, and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 1 recites the limitation "said switch box" in line 5. There is insufficient antecedent basis for this limitation in the claim.

5. Claim 3 recites the limitations "said switch box" and "said node" in line 1. There is insufficient antecedent basis for these limitations in the claim.

6. Claim 5 recites the limitations "said switch box" in line 1 and "said node" in line 2. There is insufficient antecedent basis for these limitations in the claim.

7. Claim 6 recites the limitation "said node" in line 2. There is insufficient antecedent basis for this limitation in the claim.

8. Claim 7 recites the limitation "said private network" in line 1. There is insufficient antecedent basis for this limitation in the claim.

9. Claim 10 recites the limitation "said node" in line 3. There is insufficient antecedent basis for this limitation in the claim.

10. Claim 10 recites the limitation "the electrical signal" in line 2. There is insufficient antecedent basis for this limitation in the claim.

11. Claim 11 recites the limitation "the node" in line 2. There is insufficient antecedent basis for this limitation in the claim.

12. Claim 20 recites the limitations "received security information" in line 1, "said switch" in line 2, and "said node supplying information supplies" in line 2. There is insufficient antecedent basis for these limitations in the claim.

13. Claim 21 recites the limitation "said routers" in lines 3 and 5. There is insufficient antecedent basis for this limitation in the claim.

14. Claim 24 recites the limitation "said plurality of networks" in line 1. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

15. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

16. Claims 1-14, 16, 17, 22-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Nesset et. al. (US Pat. No. 5,968,176).

17. Referring to claims 1 and 6:

Nesset et. al. disclose a network apparatus comprising:

A.) a plurality of private networks with routers to external networks (see Figure 2; Column 10, lines 28-31 and lines 47-55);

and

B.) a plurality of switch boxes connecting said private networks to a plurality of network enabled nodes (see Figure 2 and Column 10, lines 53-58);

and

C.) said switch box comprising a switch that controls which of said private networks is connected to said plurality of nodes (see Column 12, lines 56 –65).

18. As to Claim 2:

Nesset et. al. disclose the limitations of claim 1 above and further disclose:

D.) said switch is controlled by one of said private networks (see Column 6, line 64 to Column 7, line 12).

19. Referring to Claim 3:

Nesset et. al. disclose the limitations of claim 1 above and further teach a filtering mechanism in a Network Interface Card (NIC) that, by effectively dropping packets from one source and allowing packets from another, function as a switch between two or more networks and thereby disclose

E.) wherein said switch box is built into said node (see Column 11, lines 54-56).

20. Referring to Claim 4:

Nesset et. al. disclose the limitations of claim 1 above, and further disclose:

F.) wherein said plurality of switch boxes are built into a hub used to connect a plurality of nodes (see Column 12, lines 57-65 and Column 10, lines 47-49).

21. Referring to Claim 5:

Nesset et. al. disclose the limitations of claim 1 above, Nesset et. al. further disclose:

G.) wherein said switch box is located between a hub used to connect a plurality of nodes and the said node (see Figure 2, and Column 10, lines 47-57).

22. Referring to Claim 7:

Nesset et. al. disclose the limitations of claims 1 and 2 above, Nesset et. al. further disclose:

H.) said private network that controls switch comprises a node that controls switch (see Column 6, line 64 to Column 7, line 21).

23. Referring to Claim 8:

Nesset et. al. disclose the limitations of claim 1 above, Nesset et. al. further disclose:

I.) wherein said switch box additionally comprises a firewall (see Column 11, lines 54-62 and Column 13, lines 10-12).

24. Referring to Claim 9:

Nesset et. al. disclose the limitations of claim 1 and claim 8 above, Nesset et. al. further disclose:

J.) wherein said switch box additionally comprises memory readable by said firewall (see Column 13, lines 42-49).

25. With respect to Claim 10:

Nesset et. al. disclose the limitations of claim 1, claim 8, and claim 9 above, Nesset et. al. further disclose:

K.) said switch box comprises a memory writer control that comprises an AND function with the electrical signal that enables said switch to connect said controlling network to said node (see Column 13, lines 46-49).

26. Referring to Claim 11:

Nesset et. al. disclose the limitations of claim 1 above, Nesset et. al. further disclose:

L.) wherein said switch box comprises connection with a plurality of electrical signals within the node (see Column 11, lines 25-31 and lines 54-62).

27. With regards to Claim 12:

Nesset et. al. disclose the limitations of claim 1, claim 2, claim 7, and claim 12 above, Nesset et. al. further disclose:

M.) wherein said plurality of private networks comprises a node for recording logging information (see Column 16, lines 43 –54).

28. Referring to Claim 13:

Nesset et. al. disclose the limitations of claim 1 above, Nesset et. al. further disclose:

N.) wherein the plurality of private networks operate on a plurality of media (see Column 13, line 50 to Column 14, line 18).

29. Referring to Claim 14:

Nesset et. al. disclose the limitations of claim 1 and claim 13 above, Nesset et. al. further disclose:

O.) wherein said plurality of media comprises different protocols operating over said plurality of private networks (see Column 13, line 65 to Column 14, line 7).

30. With respect to Claim 16:

Nesset et. al. disclose the limitations of claim 1 above, Nesset et. al. further disclose:

Q.) wherein said plurality of nodes essentially only receive data and are connected to said plurality networks simultaneously (see Column 11, lines 24-30).

31. Referring to Claim 17:

Nesset et. al. disclose the limitations of claim 1 above, Nesset et. al. further disclose:

R.) wherein said plurality of nodes essentially only send data and are connected to said plurality networks simultaneously (see Column 11, lines 24-30).

32. With regards to Claim 22:

Nesset et. al. disclose:

S.) a means for connecting a plurality of public network connected private networks to a plurality of nodes; and a means for switching on of said private networks to one or more of said nodes; and a means for checking data packets passing from said public network to said nodes (see Figure 2; Column 10, lines 29-31 and lines 47-59; and Column 11, lines 54-56).

33. Referring to Claim 23:

Nesset et. al. disclose:

T.) a plurality of private networks with routers to external networks (see Figure 2 and Column 10, lines 28-31 and lines 47-55); and

U.) a plurality of switch boxes connecting said private networks to a plurality of network enabled nodes (see Figure 2 and Column 10, lines 53-58); and

V.) said switch box comprising a switch that determines which network is connected to which nodes (see Column 12, lines 56 –65) ; and

W.) said switch controlled by a computer on one of said plurality of networks (see Column 6, line 64 to Column 7, line 21); and

X.) said switch box comprising a firewall (see Column 11, lines 54-62 and Column 13, lines 10-12); and

Y.) said switch box comprising memory read by said firewall (see Column 13, lines 42-49); and

Z.) said memory written by said switch controlling computer (see Column 13, lines 42-49).

34. Referring to Claim 24:

Nesset et. al. disclose the limitations of claim 23 above, Nesset et. al. further disclose:

A2.) said plurality of networks operating over a single media using a plurality of network protocols (see Column 13, lines 56-59 and line 64 to Column 14, line 3).

35. Claims 18, 19, 20, and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Erwin et. al. (Erwin et. al. *Virtual Private Networks*. 2nd ed. Sebastopol, CA: O'Reilly and Associates, 1999).

36. Referring to Claim 18:

Erwin et. al. disclose :

B2.) notifying a node on a first private network of the need to access a plurality of nodes from a node on a public network (see section 4.2.1 "Dialing into an ISP that Supports PPTP");

and

C2.) said notified node supplying security information about said plurality of nodes to said public node; and

said notified node supplying security information about said public node to said plurality of nodes (see section 4.2.1 "Dialing into an ISP that Supports PPTP," as well as section 4.1 "Differences Between PPTP, L2F, and L2TP" for a brief discussion on security and authentication in VPNs and PPTP) ;

D2.) said notified node switching said plurality of nodes to a second private network; and said public node sending and receiving information with said plurality of nodes; and said notified node switching said plurality of nodes to said first private network (see 4.2.1 "Dialing into an ISP that Supports PPTP").

37. With regards to Claim 19:

Erwin et. al. disclose:

E2.) Wherein said plurality of nodes send security information to said public node after switch has been changed to said second private network (see section 4.2.1 "Dialing into an ISP that Supports PPTP," as well as section 4.1 "Differences Between PPTP, L2F, and L2TP" for a brief discussion on security and authentication in VPNs and PPTP).

38. With regards to Claim 20, Erwin et. al. disclose:

F2.) wherein said sent and received security information passes through a firewall in said switch and said node supplying information supplies firewall check list to firewall readable memory (see 4.2.1 "Dialing into an ISP that Supports PPTP").

39. With regards to Claim 21, Erwin et. al. disclose:

G2.) sending and receiving information at said routers with a plurality of protocols (see 4.2 "How PPTP Works"); and

H2.) passing information between said routers and said nodes over a single media (see 4.1 "Differences Between PPTP, L2F, and L2TP"); and

I2.) Sending and receiving information at said nodes with a plurality of protocols (see 4.2 "How PPTP Works").

***Claim Rejections - 35 USC § 103***

40. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

41. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

42. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Nessett et. al. and Collins (US Pat. No. 5,671,355) as applied to claim 15 above.

Nessett et. al. disclose a network apparatus comprising:

J2.) a plurality of private networks with routers to external networks (see Figure 2; Column 10, lines 28-31 and lines 47-55);

and

K2.) a plurality of switch boxes connecting said private networks to a plurality of network enabled nodes (see Figure 2 and Column 10, lines 53-58); and

L2.) said switch box comprising a switch that controls which of said private networks is connected to said plurality of nodes (see Column 12, lines 56 –65).

43. Nessett et. al. fail to specifically disclose a switch box that is reconfigurable to support different protocols. However, Collins discloses:

M2.) a network transceiver that is reconfigure to support different protocols (see Collins: Column 9, line 48 to Column 10, line 3);

44. It would have obvious to one of ordinary skill in the artat the time the invention was made to implement Nessett et. al. disclosed plurality of networks and switch boxes using Collins reconfigurable transceiver in order to have different protocols on the plurality of networks and have switch boxes capable of switching between these networks (see Collins: Column 1, lines 43-60).

***Conclusion***

45. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Wong et. al. "Method and Apparatus for Controlling Access to Services within a Computer Network" (US Pat. No. 5,835,727), Radia et. al. "Method and Apparatus for Dynamic Packet Filter Assignment" (US Pat. No. 5,848,233), and the Alliance Datacom sale's sheet for the Ascend MAX 4000 (equipment mentioned in Erwin et al) available at <http://www.alliancedatacom.com/products/ascend/ascend_line_4000.asp> .

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John F Gianola whose telephone number is (703) 605-4321. The examiner can normally be reached on Mon - Fri (8:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim Vu can be reached on (703) 305-4393. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

In October of 2004, Technology Center 2100 will be relocating to the US Patent and Trademark Office's facility in Alexandria, VA. After that date, calls to John F Gianola should be directed to (571) 272-3848. Likewise, the telephone number for Technology Center 2100 will change to (571) 272-2100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KIM VU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100

| Notice of References Cited | Application/Control No. 09/802,710 | Applicant(s)/Patent Under Reexamination WATTS, MICHAEL P.C. | |
|---|---|---|---|
| | Examiner John F Gianola | Art Unit 2135 | Page 1 of 1 |

**U.S. PATENT DOCUMENTS**

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Name | Classification |
|---|---|---|---|---|---|
| | A | US-5,848,233 | 12-1998 | Radia et al. | 713/201 |
| | B | US-5,835,727 | 11-1998 | Wong et al. | 709/238 |
| | C | US-5,671,355 | 09-1997 | Collins, Mark Andrew | 709/250 |
| | D | US- | | | |
| | E | US- | | | |
| | F | US- | | | |
| | G | US- | | | |
| | H | US- | | | |
| | I | US- | | | |
| | J | US- | | | |
| | K | US- | | | |
| | L | US- | | | |
| | M | US- | | | |

**FOREIGN PATENT DOCUMENTS**

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Country | Name | Classification |
|---|---|---|---|---|---|---|
| | N | | | | | |
| | O | | | | | |
| | P | | | | | |
| | Q | | | | | |
| | R | | | | | |
| | S | | | | | |
| | T | | | | | |

**NON-PATENT DOCUMENTS**

| * | | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) |
|---|---|---|
| | U | Erwin et. al. Virtual Private Networks. 2nd ed. Sebastopol, CA: O'Reilly and Associates, 1999 |
| | V | MAX 4000 Multiprotocol WAN Access Switch. Alliance Datacom. <http://www.alliancedatacom.com/products/ascend/ascend_line_4000.asp> |
| | W | |
| | X | |

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Please type a plus sign (+) inside this box →

PTO/SB/08A (08-00)
Approved for use through 10/31/2002. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO

# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

*(use as many sheets as necessary)*

Sheet | | of | |

| Complete if Known | |
|---|---|
| Application Number | |
| Filing Date | |
| First Named Inventor | |
| Group Art Unit | |
| Examiner Name | |
| Attorney Docket Number | |

jc996 U.S. PTO 09/802710 03/08/01

## U.S. PATENT DOCUMENTS

| Examiner Initials* | Cite No.[1] | U.S. Patent Document Number | Kind Code[2] (if known) | Name of Patentee or Applicant of Cited Document | Date of Publication of Cited Document MM-DD-YYYY | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear |
|---|---|---|---|---|---|---|
| JH | 3 | 5968176 | | NESSET | 10/19/99 | Figure 2, Figure 7 |
| JH | 4 | 6141755 | | DOWD | 10/31/2000 | Figure 1 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

## FOREIGN PATENT DOCUMENTS

| Examiner Initials* | Cite No.[1] | Foreign Patent Document Office[3] | Number[4] | Kind Code[5] (if known) | Name of Patentee or Applicant of Cited Document | Date of Publication of Cited Document MM-DD-YYYY | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear | T[6] |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| Examiner Signature | JH | Date Considered | 8/22/2004 |
|---|---|---|---|

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Unique citation designation number. [2] See attached Kinds of U.S. Patent Documents. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U. S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

Virtual Private Networks, 2nd Edition
By Mike Erwin, Charlie Scott, Paul Wolfe

Table of Contents

**Chapter 4. Implementing Layer 2 Connections**

# 4.1 Differences Between PPTP, L2F, and L2TP

Both PPTP and L2F allow you to use any authentication method you would normally use with PPP, including PAP and CHAP—essentially whatever authentication protocols both the client and server support. For encryption, PPTP uses the RC4 cipher with either 40-bit or 128-bit keys. L2F, on the other hand, supports 40-bit or 56-bit DES encryption with the 11.2 versions of Cisco's IOS. IOS version 11.3(3)T and later supports IPSec, which can also be used to encrypt an L2F connection.

L2TP combines the best features of PPTP and L2F and allows for either client-initiated or remote access switch-initiated L2TP connections. You can use L2TP in any situation where you might use PPTP or L2F. It can still use the same authentication protocols as the others, including PAP, CHAP, and MS-CHAP. IPSec is the recommended encryption mechanism for L2TP. Although that L2TP was reputed to "replace" PPTP, Microsoft has chosen to continue providing PPTP in Windows NT 5.0 for those who do not wish to maintain the public key infrastructure required for IPSec.

PPTP is available on currently shipping versions of Windows NT Server 4.0 and Windows NT Workstation 4.0 as part of Remote Access Services (RAS)—NT's dial- up networking software. Microsoft's PPTP support for Windows 95 is included in their Dial-Up Networking Upgrade Version 1.3. Microsoft has also released LAN-to-LAN PPTP connections for Windows NT in their "Routing and Remote Access" software (codenamed "Stronghold"), as part of the Windows NT Option Pack. PPTP support is included in Windows 98. Microsoft Windows NT 5.0 will also support PPTP connections.

A Macintosh PPTP client is available from Network TeleSystems (http://www.nts.com). Called TunnelBuilder, it offers full PPTP support, including NT domain login and data encryption. Network TeleSystems (NTS) also has a version of TunnelBuilder for Windows 95, Windows 98, Windows for Workgroups, and Windows 3.1. Since Microsoft doesn't plan on supporting PPTP on down-level versions of Windows, this allows users with legacy systems to run PPTP. The NTS Windows clients support L2TP. In addition, Linux is now capable of supporting PPTP.

There are also a number of hardware devices that support PPTP out of the box. These devices are known variously as remote access servers, remote hubs, terminal servers, and remote access switches. In this chapter, we will refer to them simply as remote access switches, because that term is prevalent in the industry and best describes what they do. There are a number of remote access switches that support PPTP, among them Ascend's MAX line, the 3Com/U.S. Robotics Total Control line, and ECI Telematics' Nevada. These are typical brands used in ISP points-of-presence and corporate networks to terminate modem and ISDN calls. PPTP is included as part of all of these products free of charge—no additional activation fees are required. There are also some hardware devices that act as PPTP servers, but do not operate as a standard remote access

switch. Examples of these are the Bay Networks Extranet Switch and the NTS TunnelMaster.

L2F is supported by Cisco in their IOS software for their routers. Other vendors, such as Nortel and Shiva, also support L2F. L2TP is supported in Cisco IOS 11.3(5)AA and later. In addition, many other hardware devices support it. Microsoft will include L2TP support in Windows NT 5.0. Because PPTP, L2F, and L2TP operate similarly, we will concentrate on PPTP and L2TP.






# MAX 4000 Multiprotocol WAN Access Switch

The MAX™ 4000 product is a high-powered, multiprotocol WAN access switch that allows corporations, carriers and service providers to extend their backbone networks and support remote office, teleworking and Internet access. Based on the True Access Operating System (TAOS), it is easy to configure and offers the scalability, robust software features and high-performance digital modems needed for building high-density remote networks.

The MAX 4000 combines the functionality of a router, a terminal server, an ISDN switch and a frame relay concentrator. The scalable architecture allows remote users to move from analog systems to digital connectivity, using existing carrier E1/T1/PRI circuits. NavisAccess network management software provides extensive wide area network and service management from a central site.

**Key Benefits**

- Integrated security for reliable, secure access to the Internet, an intranet or virtual private network
- Enhanced performance and reduced operating costs with high-speed Series56 Digital Modem
- Scalable platform and integrated software that enables additional functionality without additional expense

Contact Dan Clarke at (888) 872-5619 ext.18 or submit a Quick Quote form today.

# Ascend MAX 4000 Datasheet

The MAX 4000 is a high-performance wide area network access switch that lets corporations extend their corporate backbone networks out to sites such as remote offices, telecommuters, and other corporations.

The MAX 4000 is also used by Internet and network service providers to provide access to their services for users via ISDN, frame relay, and leased lines. The MAX also provides access for modem-based remote users, who can connect to digital-based MAX systems equipped with integrated digital modems.

By eliminating separate access lines, terminal servers and modem racks, the MAX 4000 saves equipment and transmission costs and provides a single entity for management and security. The MAX 4000 uses a single set of digital access lines to provide 96 simultaneous dial-up connections, 48 of which can originate from analog modem users.

## Digital WAN Access

The MAX 4000 supports a wide range of digital access lines for connection to WAN services.

- ISDN PRI
- ISDN BRI
- T1 and E1
- Fractional T1
- Frame Relay

## Digital Modems

Integrated high-speed digital modems provide full access to analog callers. Digital modems allow modem-based users with analog phone lines to dial into the MAX 4000 over channelized T1/PRI access lines.

- V.34 or V.32 bis digital modems
- MNP and V.42 bis
- Software upgradeable

## Full Routing, Bridging, and Terminal Server Functions

Sophisticated support for standard protocols ensures efficient connectivity for remote users to corporate LANs and the Internet.

- Routes TCP/IP and IPX
- Bridges all protocols (BCP standard bridging)
- PPP and SLIP/Terminal Service
- Dynamic IP address assignment
- V.120 asynchronous rate adaption

## Bandwidth on Demand

Dial-up connections are automatically established and removed for transparent client-server computing across the WAN. Inverse multiplexing aggregates multiple calls for greater bandwidth.

- Dial-on-demand bandwidth based on packet address
- Increase or decrease bandwidth during connection
- 56 kbit/s to 4 Mbit/s selectable bandwidth per call
- Bandwidth controlled manually,automatically, or by time-of-day profile
- Inverse Multiplexing Protocols:
  - MP (MultiLink PPP)
  - MPP (Multichannel PPP)
  - BONDING
  - AIM (Ascend Inverse Multiplexing)
  - Hardware-based industry-standard STAC header and data compression increases performance

---

## Security

Support for standard user-authentication systems fits into your current network security architecture. Networked server-based authentication makes it easy to manage large-scale remote access installations.

- PAP and CHAP
- RADIUS and TACACS
- Support for token-based security systems, including SecurID and Enigma
- Callback (digital connections)
- Calling Line ID (CLID)
- Password protected terminal server access
- Transmit and receive packet filtering

---

## Management and Control

Manage all functions of the MAX 4000 through your choice of interface, either locally or remotely.

- SNMP MIBs: MIB 2, DS1/E1, RS-232, Ascend Enterprise MIB
- Password protected Telnet remote management
- Local management via VT-100 terminal
- PPP LQM (Link Quality Monitoring)
- Annex D Frame Relay link monitoring
- FLASH memory for easy upgrades
- Remote software upgrades
- ISDN event log and syslog support

---

## Frame Relay Wide Area Access Switch

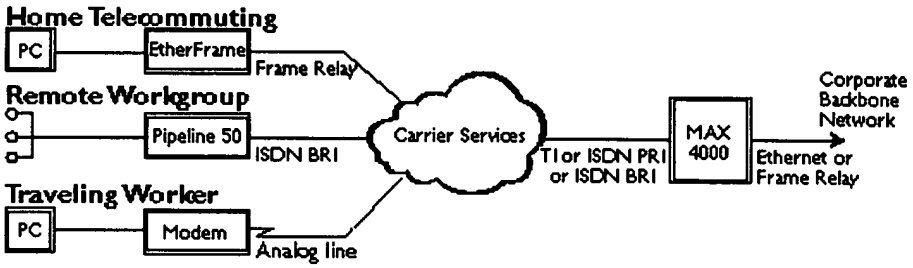
Optional EtherFrame software concentrates incoming frame relay traffic from Ascend's Pipeline EtherFrame and other frame relay access devices along with analog and digital dial-in traffic. High-speed synchronous V.35 port connects directly to a frame relay switch at 8 Mbit/s.

- Route to multiple frame relay PVCs over single or multiple interfaces
- Supports up to 4000 PVCs with RADIUS
- Dial-in PPP-to-frame relay gateway function with PVC selected on a per-user basis
- RFC 1490 encapsulation

Internet service providers use the Ascend MAX 4000 to provide Internet access to their ISDN BRI, frame relay, and modem-based customers. A MAX 4000 connects to the WAN with up to

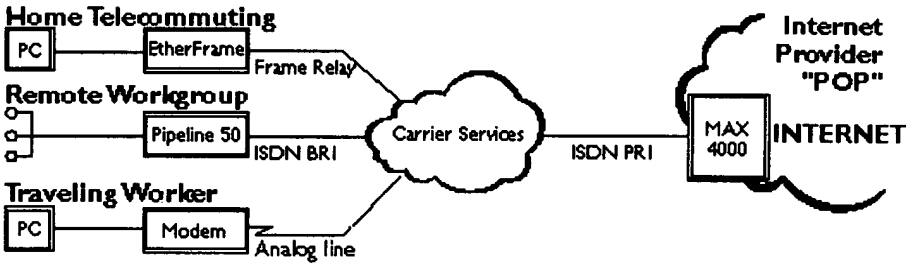
4 ISDN PRI lines.

## Remote and Telecommuter Access to the Backbone Network



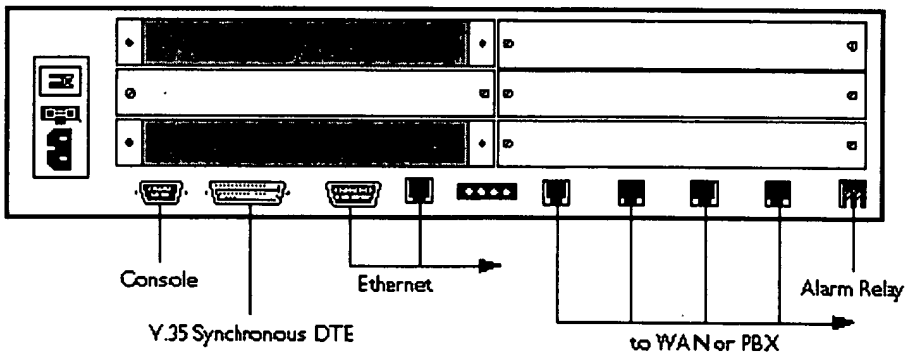

Ascend MAX 4000 allows up to 96 simultaneous calls from ISDN BRI, Frame Relay or modem users to the corporate backbone network over ISDN PRI, channelized T1, or ISDN BRI lines. Up to 48 of the 96 calls can be from modem users.

## Internet Information Provider and Carriers: POP in a Box




Internet service providers use the Ascend MAX 4000 to provide Internet access to their ISDN BRI, Frame Relay, and modem-based customers. A MAX 4000 connects to the WAN with up to 4 ISDN PRI lines.

## Ascend MAX 4000 Back Panel




## Hardware Specifications

- Dimensions 3" x 17" x 12"
- Weight 15 lbs, 30 lbs fully loaded

## External Interfaces

- LAN Interface 10 Mbit/s Ethernet (AUI, 10Base-T)
- WAN Interfaces 4 T1 Lines via RJ48 USOC Jacks
- High-Speed Serial Interface 8 Mbit/s DB-44 Port for V.35 DTE HDLC Connection
- Local Management Interface Alarm DB-9 Interface for VT-100 Console
- Screw Terminal for Alarm Indication

## Power Requirements

- 80-200 Watts, 47-63 Hz, 90-240 VAC

## Operating Requirements

- 32-104deg. Fahrenheit
- 0-14,800 ft. Altitude
- Relative Humidity 0-90%

## Safety Certifications

- CSA 950, NTRL/UL 1950
- TUV EN 60 950

## EMI/RF

- FCC Part 68
- FCC Part 15

## Base Hardware Configuration

- Four T1/PRI Interfaces
- 10 Mbit/s Ethernet (AUI, 10Base-T)
- Intel 80960CF RISC Processor
- 64 Channel HDLC Controller
- High-speed (8 Mbit/s) V.35 DTE Synch Port
- STAC Hardware Compression Coprocessor
- DB-9 VT-100 Management Port
- Alarm Relay
- Integrated T1/E1 CSU Models

## Available Expansion Modules

- 8 V.34 Digital Modems
- 8 V.32 bis Digital Modems
- 8 BRI Terminal Ports
- 8 BRI Network Ports
- 8 Channel V.110 Adapter
- 2 RS-232 Inverse Multiplexing Ports
- 6 V.35/RS449 or X.21 Inverse Multiplexing Ports
- 32 Channel HDLC Controller

---

## Bundled Software Functionality

- Routing and Bridging
- Packet Filtering
- Terminal Server, PPP Server
- Integrated SNMP and Telnet-based Management
- Full User and Device Authentication
- Ascend RADIUS Support Extension

---

## Available Software Options

- Frame Relay
- ISDN Signaling
- Multirate ISDN
- PRI-to-T1 Conversion
- Dynamic Bandwidth Allocation (TM)
- Ascend Inverse Multiplexing and BONDING
- RS-366 Dialing
- V.25 bis Dialing
- V.120 Rate Adaption

Contact Dan Clarke at (888) 872-5619 ext.18 or submit a Quick Quote form today.

Back to the top ^

## Ascend Max 4000

| Ascend Max 4000 Model | # of T1's | I.O.S. |
|---|---|---|
| 4000 | 2 | 7.0.4 |
| 4000 | 4 | 7.0.4 |
| 4000 | 2 | 7.0.4 |
| 4000 | 2 | 7.0.4 |

| | | |
|---|---|---|
| 4000 | 2 | 7.0.4 |
| 4000 | 4 | 7.0.4 |
| 4000 | 4 | 7.0.4 |
| 4000 | 2 | 7.0.4 |
| 4000 | 4 | 7.0.4 |
| 4000 | 2 | 7.0.4 |
| 4000 | 2 | 7.0.4 |
| 4000 | 4 | 7.0.4 |
| 4000 | 2 | 7.0.4 |

Contact Dan Clarke at (888) 872-5619 ext.18 or submit a Quick Quote form today.

Back to the top ^

## MAX 4048/4060 WAN Access Switches

MAX™ 4048/4060 WAN access switches fulfill the needs of small- to mid-sized network service providers and the remote networking needs of enterprises of all sizes. Based on the True Access Operating System (TAOS), these switches are easy to configure and offer scalability, robust software features and the high-performance digital modems needed for building high-density remote networks.

The MAX 4048 product has two T1 interfaces with 48 digital modems. The MAX 4060 product has two E1 interfaces with up to 60 digital modems. Both products combine the functionality of a router, a terminal server, an ISDN switch, and a frame relay concentrator. Enhanced system capabilities provide a migration path from analog modem access to ISDN BRI access. NavisAccess network management software provides extensive wide area network and service management.

**Key Benefits**

- Integrated security for reliable, secure access to the Internet, an intranet or virtual private network
- Enhanced performance and reduced operating costs with high-speed Series56 Digital Modem
- Scalable platform and integrated software that enables additional functionality without additional expense

## Ascend Max 4048

| Ascend Max 4048 Model | # of T1's | I.O.S. |
|---|---|---|
| 4048 | 2 | 7.0.4 |
| 4048 | 2 | 7.0.4 |

Contact Dan Clarke at (888) 872-5619 ext.18 or submit a Quick Quote form today.

Back to the top ^

Print this page